

WHAT IS CLAIMED IS:

1. A method for manufacturing an optical compensation film, comprising steps of:

- a) providing a first substrate;
- b) forming a first linear photo reactive polymer layer on said first substrate;
- c) exposing said first linear photo reactive polymer layer in a transmissive polarized-light UV for forming a horizontal condensing electric field orientation layer along an x-axis;
- d) forming a first liquid crystal polymer layer on said horizontal condensing electric field orientation layer;
- e) heating said first liquid crystal polymer layer;
- f) exposing said first liquid crystal polymer layer in a first UV light for forming a first optical anisotropy film having said x-axis optic axis;
- g) forming a second linear photo reactive polymer layer on said first optical anisotropy film;
- h) exposing said second linear photo reactive polymer layer in a reflective polarized-light UV for forming a vertical condensing electric field orientation layer along a y-axis;
- i) forming a second liquid crystal polymer layer on said vertical condensing electric field orientation layer;
- j) heating said second liquid crystal polymer layer; and
- k) exposing said second liquid crystal polymer layer in a second UV light for forming a second optical anisotropy film having said y-axis optic axis, thereby an optical compensation film with double optical-axes being formed with said first optical anisotropy film and said second optical anisotropy film.

2. The method as claimed in claim 1, wherein said first linear photo reactive

polymer layer is formed by coating a linear photo reactive polymer on said first substrate.

3. The method as claimed in claim 1, wherein said second linear photo reactive polymer layer is formed by coating said linear photo reactive polymer on said first optical anisotropy film.

4. The method as claimed in claim 1, wherein said optical compensation film with double optical-axes has an in-plane retardation value R_o , where $0 \leq R_o \leq 400$ nm, and an out-of-plane retardation value R_{th} , where $0 \leq R_{th} \leq 300$ nm.

5. The method as claimed in claim 1, wherein said optical compensation film is attached on one of a thin film transistor and a color filter for a liquid crystal display to display a wide view.

6. The method as claimed in claim 1, wherein said first substrate is formed by a first rolled-up film.

7. The method as claimed in claim 6, wherein said x-axis is parallel to one moving direction of said first rolled-up film and is perpendicular to said y-axis.

8. The method as claimed in claim 1, wherein said transmissive polarized-light UV, said reflective polarized-light UV, said first UV light, and said second UV light are provided by a UV light source.

9. The method as claimed in claim 8, wherein said UV light source condenses a third UV light as a parallel beam by a condenser.

10. The method as claimed in claim 9, wherein said parallel beam is an electromagnetic wave along a z-axis and has a horizontal electric field component along said x-axis and a vertical electric field component along said y-axis, both vibrating on an x-y plane.

11. The method as claimed in claim 9 further comprising to provide a first

reflector and a second reflector for improving the utility of said third UV light by means of reflecting said vertical electric field component to polarize said second linear photo reactive polymer layer.

12. The method as claimed in claim 11, wherein said UV light source generates said reflective polarized-light UV and said transmissive polarized-light UV via a polarized-light generator by receiving said parallel beam and reflecting said vertical electric field component and transmitting said horizontal electric field component simultaneously.

13. The method as claimed in claim 12, wherein said polarized-light generator includes plural layers of quartz chips, and is positioned between said condenser and said first rolled-up film.

14. The method as claimed in claim 13, wherein said plural layers of quartz chips have an inclination between 30 to 60 degrees for reflecting said second electric field component.

15. The method as claimed in claim 14, wherein said inclination is 57 degrees of Brewster Angle for transmitting said horizontal electric field component.

16. An exposing procedure for manufacturing an optical compensation film on a liquid crystal display for displaying a wide view, comprising steps of:

- a) forming a first linear photo reactive polymer layer on a first substrate;
- b) exposing said first linear photo reactive polymer layer in a transmissive polarized-light UV for forming a horizontal condensing electric field orientation layer along an x-axis;
- c) forming a first liquid crystal polymer layer on said horizontal condensing electric field orientation layer;
- d) heating said first liquid crystal polymer layer;

e) exposing said first liquid crystal polymer layer in a first UV light for forming a first optical anisotropy film having an x-axis optic axis;

f) forming a second linear photo reactive polymer layer on said first optical anisotropy film;

g) exposing said second linear photo reactive polymer layer in a reflective polarized-light UV for forming a vertical condensing electric field orientation layer along a y-axis;

h) forming a second liquid crystal polymer layer on said vertical condensing electric field orientation layer;

i) heating said second liquid crystal polymer layer; and

j) exposing said second liquid crystal polymer layer in a second UV light for forming a second optical anisotropy film having said y-axis optic axis, thereby an optical compensation film with double optical-axes being formed with said first optical anisotropy film and said second optical anisotropy film.

17. The procedure as claimed in claim 16, wherein said first substrate is formed by a first rolled-up film.

18. An exposing device for manufacturing an optical compensation film, comprising:

a driving device for driving a first rolled-up film to form a substrate of said optical compensation film;

a first coater for coating a first linear photo reactive polymer on said substrate to form a first linear photo reactive polymer layer;

a UV light source for emitting a first UV light, a second UV light and a third UV light;

a condenser for condensing said first UV light as a parallel beam;

a polarized-light generator having plural layers of quartz chips, and positioned between said condenser and said first rolled-up film, forming a reflective polarized-light UV and a transmissive polarized-light UV by receiving said parallel beam, and forming a horizontal condensing electric field orientation layer along an x-axis by polarizing said first linear photo reactive polymer layer with said transmissive polarized-light UV; and

a second coater for forming a first optical anisotropy film having said x-axis optic axis by steps of coating a first liquid crystal polymer layer on said first linear photo reactive polymer layer, heating and exposing with said second UV light.

19. The device as claimed in claim 18, wherein said parallel beam is an electromagnetic wave along a z-axis and has a horizontal electric field component along said x-axis and a vertical electric field component along a y-axis, both vibrating on an x-y plane.

20. The device as claimed in claim 19 further comprising:

a second linear photo reactive polymer layer formed on said first optical anisotropy film by coating said linear photo reactive polymer;

a vertical condensing electric field orientation layer along said y-axis on said second linear photo reactive polymer layer by exposing with said reflective polarized-light UV; and

a second optical anisotropy film having said y-axis optic axis on said second linear photo reactive polymer layer by steps of coating said second linear photo reactive polymer layer, heating and exposing with said third UV light.

21. The device as claimed in claim 19, wherein said x-axis is parallel to one moving direction of said first rolled-up film and is perpendicular to said y-axis.

22. An exposing procedure for manufacturing a first optical compensation

film and a second optical compensation film, comprising steps of:

- a) providing a first rolled-up film having a first optical anisotropy film along a y-axis and a second rolled-up film having a second optical anisotropy film along an x-axis;
- b) forming a first linear photo reactive polymer layer and a second linear photo reactive polymer layer on said first rolled-up film and said second rolled-up film respectively;
- c) providing a UV light source to emit a first UV light, a second UV light, and a third UV light;
- d) condensing said first UV light as a parallel beam by a condenser;
- e) generating a reflective polarized-light UV and a transmissive polarized-light UV by receiving said parallel beam, reflecting a vertical electric field component and transmitting a horizontal electric field component simultaneously;
- f) respectively exposing said first linear photo reactive polymer layer and said second linear photo reactive polymer layer with said transmissive polarized-light UV and said reflective polarized-light UV for forming a horizontal condensing electric field orientation layer along said x-axis and a vertical condensing electric field orientation layer along said y-axis;
- g) respectively coating a first liquid crystal polymer layer on said horizontal condensing electric field orientation layer and a second liquid crystal polymer layer on said vertical condensing electric field orientation layer;
- h) heating said horizontal condensing electric field orientation layer and said vertical condensing electric field orientation layer; and
- i) respectively exposing said horizontal condensing electric field orientation layer and said vertical condensing electric field orientation layer with said second UV light and said third UV light for forming a third optical anisotropy

film having said x-axis optic axis and a fourth optical anisotropy film having said y-axis optic axis.

23. The procedure as claimed in claim 22, wherein said first linear photo reactive polymer layer and said second linear photo reactive polymer layer are formed by coating a linear photo reactive polymer on said first rolled-up film and said second rolled-up film respectively.

24. The procedure as claimed in claim 22, wherein said parallel beam is an electromagnetic wave along a z-axis and has said horizontal electric field component along said x-axis and said vertical electric field component along said y-axis, both vibrating on an x-y plane.

25. The procedure as claimed in claim 22, wherein said reflective polarized-light UV and said transmissive polarized-light UV are both generated by a polarized-light generator.

26. The procedure as claimed in claim 22, wherein said x-axis is parallel to the moving directions of said first rolled-up film and said second rolled-up film and is perpendicular to said y-axis.

27. The procedure as claimed in claim 22, wherein said x-axis is perpendicular to the moving directions of said first rolled-up film and said second rolled-up film and is perpendicular to said y-axis.

28. A method for manufacturing an optical compensation film, comprising steps of:

- a) generating a reflective polarized-light UV and a transmissive polarized-light UV;

- b) exposing a first linear photo reactive polymer layer with said transmissive polarized-light UV for forming a horizontal electric field orientation layer;

- c) coating a first liquid crystal polymer layer on said horizontal electric field

orientation layer for forming a first optical anisotropy film along an x-axis ;

d) exposing a second linear photo reactive polymer layer on said first optical anisotropy film with said reflective polarized-light UV for forming a vertical electric field orientation layer; and

e) coating a second liquid crystal polymer layer on said vertical electric field orientation layer for forming a second optical anisotropy film along a y-axis.

29. The method as claimed in claim 28, wherein said reflective polarized-light UV and said transmissive polarized-light UV are generated by polarizing a parallel beam being an electromagnetic wave along a z-axis and having an electric field with multiple vibrating directions.

30. The method as claimed in claim 29, wherein said parallel beam is a first UV light with a wave length of 190 nm to 400 nm.

31. The method as claimed in claim 28, wherein said first linear photo reactive polymer layer is formed by coating a first linear photo reactive polymer on a substrate.

32. The method as claimed in claim 28, wherein said step a) is achieved by a polarized-light generator.

33. The method as claimed in claim 28, wherein said reflective polarized-light UV and said transmissive polarized-light UV are formed by reflecting and transmitting a vertical component and a horizontal component of said electric field with multiple vibrating directions respectively.

34. The method as claimed in claim 28, wherein said horizontal electric field orientation layer and said vertical electric field orientation layer are a horizontal condensing electric field orientation layer along said x-axis and a vertical condensing electric field orientation layer along said y-axis respectively.

35. The method as claimed in claim 28, wherein said step c) and step e) both further include steps of heating and exposing with a second UV light and a third UV light respectively.

36. A method for manufacturing an optical compensating film, comprising steps of:

a) generating a reflective polarized-light UV and a transmissive polarized-light UV by receiving a parallel beam;

b) polarizing a first linear photo reactive polymer layer and a second linear photo reactive polymer layer with said transmissive polarized-light UV and said reflective polarized-light UV for forming a horizontal electric field orientation layer and a vertical electric field orientation layer respectively; and

c) coating a first liquid crystal polymer layer on said first linear photo reactive polymer layer and a second liquid crystal polymer layer on said second linear photo reactive polymer layer for forming a first optical anisotropy liquid crystal polymer film along an x-axis and a second optical anisotropy liquid crystal polymer film along a y-axis respectively.

37. The method as claimed in claim 36, wherein said parallel beam is an electromagnetic wave along a z-axis having an electric field with multiple vibrating directions

38. A method for manufacturing an optical compensating film, comprising steps of:

a) generating a reflective polarized-light UV and a transmissive polarized-light UV by receiving a parallel beam;

b) polarizing a first linear photo reactive polymer layer and a second linear photo reactive polymer layer with said transmissive polarized-light UV and said reflective polarized-light UV for forming a horizontal electric field

orientation layer and a vertical electric field orientation layer respectively; and

c) coating a first liquid crystal polymer layer on said first linear photo reactive polymer layer and a second liquid crystal polymer layer on said second linear photo reactive polymer layer for forming a first optical anisotropy liquid crystal polymer film along an x-axis and a second optical anisotropy liquid crystal polymer film along a y-axis respectively.

39. The method as claimed in claim 38, wherein said parallel beam is an electromagnetic wave along a specific direction having an electric field with multiple vibrating directions.

40. The method as claimed in claim 39, wherein said specific direction is perpendicular to said x-axis and said y-axis.